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PATENT SPECIFICATION

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(54) IMPROVEMENTS IN OR RELATING TO ELECTRICAL WELDING CONTROL SYSTEMS

(71) We, A.R.O. MACHINERY COMPANY LIMITED, a British Company of 190 Castelnau, London SW13 9DJ, do hereby declare the invention for which we pray
5 that a Patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to systems for the
10 control of electrical welding, more especially MIG welding.

In the MIG process of arc welding a gas-shielded electrical arc is employed and a consumable electrode wire is fed to the arc.
15 The arc current depends on the wire feeding speed and also the welding voltage. Therefore, to adjust the current it is necessary for the operator to set both the wire feeding speed and the voltage, and, to facilitate
20 this, it is known to provide for the purpose on a control panel two rotary selector switches side by side in positions where they can be conveniently adjusted simultaneously, by the right and left hands of the
25 operator, respectively.

It is an object of the present invention to achieve a MIG welding control system in which the setting of arc current can be
30 achieved even more simply and conveniently.

According to the invention, there is provided control circuitry of an electrical welding machine using a consumable electrode wire, comprising a single arc current
35 selector switch that has two banks of contacts for setting both the welding voltage and the wire feeding speed respectively, in a single one-handed operation, means being provided for temporarily disabling the wire
40 feeding speed setting of said selector switch at will and substituting a separate independent control of wire feeding speed, if that should be required, and wherein each bank of contacts comprises a first series of fixed
45 contacts connected to a common line, a second series of fixed contacts equal in number to the first series and connected into a series resistor chain, and a movable contact for making electrical connection
50 between a chosen contact in the first series

and the corresponding contact in the second series according to the setting of a rotary control knob.

One arrangement according to the invention is shown by way of example in the
55 accompanying drawing, which is an electrical circuit diagram of part of the control circuitry of a MIG welding machine.

The drawing shows an arc welding current selector switch 10 operated by a
60 single rotary control knob 11 and having a switch shaft 12 that selects pairs of contacts for electrical connection in two banks of contacts, one determining the feeding speed of a consumable electrode wire and the
65 other setting the welding voltage. In the diagrammatic drawing, only the bank of contacts relating to wire feeding speed is shown; the voltage setting contact bank is omitted but it is generally similar.

The bank of wire feeding speed-setting
70 contacts 13 comprises, as shown, eight pairs of contacts 14 corresponding, respectively, to arc currents of 40, 60, 80, 100, 120, 140, 170 and 200 amperes, and a movable
75 contact 15 makes electrical connection between the arc current selection contacts of any chosen pair depending on the angular position of the rotary control knob 11. Simultaneously with the selection of
80 contacts in the wire feeding speed bank, the corresponding pair of contacts in the welding voltage bank is also being selected by the same switch knob movement, there
85 being likewise eight pairs of welding voltage contacts corresponding to the same arc current values as the wire feeding speed contacts. Thus, for general purposes, the operator of the MIG welding machine has
90 merely a single switch control knob with which to set welding arc current, despite the fact that arc current itself is dependent on the two parameters of wire feeding speed and welding voltage.

The pairs of fixed contacts in the wire
95 feeding speed selection bank are connected, as regards eight contacts of one polarity, in common to a lead 16 and, as regards the eight contacts of the other polarity, into a series resistor chain 17 connected to a lead 100

18 at one end terminal, the opposite end terminal of the resistor chain being connected to a supply lead 19. The leads 16 and 18 are coupled to leads 20 and 21 of the wire feed motor circuit through a double pole changeover switch 22.

When control of wire feeding speed independent of welding voltage is required, a rotary rheostat or potentiometer 23 is employed which has one end terminal of its winding and its rotary wiper contact connected, respectively, to two further contacts 24, 25 of the double pole switch 22, the other end terminal of the potentiometer winding being connected to the supply lead 19. Thus, by changing over the switch 22 from the contacts on the leads 16, 18 to the contacts 24, 25 the wire feed motor circuit leads 20, 21 are isolated from the wire feeding speed selector contacts of the switch 10 and are connected instead for independent wire feeding speed control by the potentiometer 23.

Although the arrangement shown is for single phase operation, it will be appreciated that the same system can be employed for three phase operation simply by providing more banks of simultaneously selected contacts.

30 WHAT WE CLAIM IS:—

1. Control circuitry of an electrical welding machine using a consumable electrode wire, comprising a single arc current selector switch that has two banks

of contacts for setting both the welding voltage and the wire feeding speed respectively, in a single one-handed operation, means being provided for temporarily disabling the wire feeding speed setting of said selector switch at will and substituting a separate independent control of wire feeding speed, if that should be required, and wherein each bank of contacts comprises a first series of fixed contacts connected to a common line, a second series of fixed contacts equal in number to the first series and connected into a series resistor chain, and a movable contact for making electrical connection between a chosen contact in the first series and the corresponding contact in the second series according to the setting of a rotary control knob.

2. Circuitry according to claim 1, wherein the independent control of wire feeding speed is provided by a rotary rheostat or potentiometer, with switch means for connecting it into circuit in place of the contact link for setting wire feeding speed.

3. Control circuitry of a MIG welding machine, substantially as described with reference to the accompanying drawing.

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COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of
the Original on a reduced scale*

